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RESEARCH PAPER

Who decides on access to genetic resources? Towards implementation of the convention on biological diversity in Nigeria

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Abstract The study examines the final level at which the decision to grant access to genetic resources is taken, gaps in the implementation of the convention on biological diversity (CBD), and how to overcome them, in Nigeria. Data were collected from literature review, a survey of policy and decision-makers concerning biodiversity, and discussions with key stakeholders on the national status of biodiversity. The study reveals that: (i) tenure arrangements place dominant rights on biodiversity control, and the final decision to grant access to genetic resources rests on indigenous landholding communities where resources occur; (ii) the rural people are willing to grant access to genetic resources including traditional knowledge developed from folklore and observations of plant and animal behaviour; and (iii) the CBD and other environmental laws in Nigeria lack effective co-ordination and basic infrastructure for their implementation. The conclusion is reached that it has become expedient for the federal government to enact a law on the CBD to serve as catalyst for the states of the federation to enact their laws and put in place a uniform mechanism for sustainable conservation of biodiversity in the Nigeria.

Keywords Dominant rights · Indigenous landholding communities · Land tenure systems · Endemism · Access to genetic resources · Natural ecosystems · Traditional knowledge · Folklore

Introduction

Access to genetic resources in Nigeria is determined by three factors, namely the consent of land owners, the level of traditional development of genetic resources by the rural people, and the abundance of species under communal control in terms of biodiversity harvest. What is access to genetic resources? Access to genetic resources

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in this study refers to activities relating to obtaining and using genetic heritage as a component of biodiversity conserved in situ or ex situ for the purpose of trade, bioprospecting, conservation, research or any other use (Nnadozie 1999). Access to genetic resources includes taking possession of components of biodiversity with their associated endemism, traditional knowledge, cultural and genetic heritage of species (Seiler and Dutfield 2001), and practices developed on them by the local people (Osemeobo 2001a; CBD 2002). Access to components of genetic heritage is subject to the provisions of laws and local regulations on wild and domesticated plants and animals within the Nigerian land boundaries with the exemption of human genetic resources.

Granting of access to genetic resources as discussed in Article 15 of the CBD rests with the national governments and it is to be granted on mutually agreed terms. These statements are linked with Article 8(j) that encourages equitable sharing of benefits arising from using components of biodiversity that are useful for conserving genetic resources. Articles 1, 10(c) and 16 (3,4) are also linked to Article 15 and are concerned with regulating access to genetic heritage, protection of genetic resources and access to and transfer of technology for the conservation and utilization of genetic resources.

Genetic resources are one of the three levels of biodiversity conservation (along with species and ecosystem diversity). Genetic resources are primarily tied to species in which they occur, such that when a species is lost its genetic resources are also lost. In Nigeria, vegetation changes have been a threat to loss of species. For example, over the last 20 years, Nigeria has witnessed major changes in the status of the natural vegetation and this has led to widespread decline in species diversity. According to FORMECU (1998), induced increases and decreases in vegetation, due to poor land-use practices in agriculture and over-harvesting of biodiversity, have negatively affected the biodiversity status. The major increase in area devoted to grazing and crop production by 21% (844,073 km^2) between 1975 and 1988 led to losses in the guinea and sudan savannah to about 4.8% of the total land area of the country. The guinea and sudan savannahs decreased by 17% (69,907 km^2), the forests decreased by 1.3% (13,837 km^2), and the coastal vegetation decreased by 1.8% (1,817 km^2). Decreases in the major vegetation types brought about increases in grasslands including exposed lands (by 6,955 km^2). The surface area exposed by human activities caused soil degradation in an area of about 175 km^2. The exposed areas that were affected by gully erosion increased by 2% (18,395 km^2). The areas under sand dunes increased by 0.3% (4,017 km^2), while rock outcrops increased by 0.3% (1,208 km^2). Thus a total land area of 23,795 km^2 was lost to viable economic use by 1998 (FORMECU 1998), thereby decreasing the productive areas for biodiversity conservation. This trend appears to be continuing, although there is a lack of recent statistics.

The challenges posed by decline of natural habitats and indigenous species were the major push factors for Nigeria to ratify the convention on biological diversity (CBD) in 1992. Unfortunately, access to biodiversity resources under the convention has not been resolved even though it is a cardinal issue for the ratification of the CBD by the country (Osemeobo 2001b). Nigeria is rich in biodiversity, spreading through six major ecological zones (from the north to the south) including the sahel savannah, sudan savannah, guinea savannah, forest-savannah mosaic, moist lowland forest and coastal-freshwater swamp. However, the biodiversity loss and rates of forest decline in each of the biogeographic region vary according to the population

of biodiversity users, the intensity of utilization, and the population of species occurring in the forests (Osemeobo 2005). Both woody and non-wood plants are widely utilised and they form a major source of household sustenance (Osemeobo and Ujor 1999). The populations of these species are low even though many of them are found in protected forests where they are being threatened due to lack of protection and inadequate shelter for wild animals (FME 2003).

In the past two decades, Nigeria had made some unsustainable efforts at managing biodiversity in areas of policy, legislature and institutional frameworks (FME 2003). The 1999 Constitution, which remains current, also encouraged government and the private sector to protect and improve the environment by safeguarding the natural resources including water, air, land, forest and wildlife hence the national policy on environment was designed to restore and maintain natural ecosystems and species. In line with the constitution, the environmental impact assessment decree of 1992 was put in place to ensure that impact assessment surveys are carried out before large-scale changes in land use are carried out (FEPA 1992).

Forest management in Nigeria involving natural regeneration practices of the natural forests carried out in the decades of 1950s and 1960s has not been impressive. Attempts to induce regeneration of the forests in the past failed because they were not based on proven research on the biology and ecology of the forests. The natural regeneration by enrichment planting (restocking gaps in the forest through indigenous species) failed because early forest colonizers choked the young seedlings introduced within canopy openings in the forest floor (Adeyoju 1975). The tropical shelterwood system (TSS) that was adapted from the India Forestry Service (Egboh 1985) also failed to regenerate the forests. Under the TSS, undesired species (*Nauclea diderrichii*, *Mitragyna africana* and *Pentaclethra macrophylla)* were poisoned to create gaps in the forest floor. The gaps created were planted with desired species (*Khaya senegalensis*, *Khaya grandifolia*, *Entandrophragma condollii* and *Melecia excelsa*), but these were also choked by climbers (Egboh 1985). The failure of natural regeneration led to plantation establishment through the taungya system. This is a multiple land-use practice of mixed cropping of food crops with tree crops for a period of two to three years until the trees close canopy. The taungya system itself failed because of constant bushfires in forest plantations and the continuing practice of shifting cultivation within forest reserves. About 21,235 ha of plantations were raised through taungya mainly in southern Nigeria (Adeyoju 1975). Nevertheless, because the taungya plantations were poorly stocked with fast growing exotic species including *Gmelina arborea* and *Tectona grandis* they did not pose a serious threat to indigenous species biodiversity. Direct plantation establishment eventually replaced the taungya system but it has since been largely abandoned due to inadequate funding (Osemeobo 2004).

This study is the first attempt to examine the issues that must be resolved to guarantee sustainable access to genetic resources in the context of the CBD in Nigeria. The objective of the research has been to identify the main constraints in access to biodiversity under the CBD document and relevant Nigerian laws. The specific objectives have been to identify areas of conflict between the CBD and existing laws in the country, examine existing gaps in the implementation of the CBD, and analyse and suggest sustainable processes for granting access to genetic resources in the country. The gaps in the CBD implementation are examined, strategies to gaining access to genetic resources are discussed, and implementation measures are suggested.

Research Method

Nigeria has been a party to the CBD since 1992. In line with Article 6(a) of the convention (CBD 1992) which states that 'each contracting party shall develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity', the Federal Ministry of Environment (which is responsible for the implementation of the biodiversity convention in Nigeria) prepared a draft copy of the national biodiversity strategy and action plan (NBSAP). The draft copy was sent to key stakeholders in government and the private sector in all the 36 states of the federation and the federal capital territory for their inputs. The state governments in turn collected inputs from local government councils which they supervise. The grassroots inputs involved 774 local government councils and these were coordinated at four zonal workshops organized by the Federal Ministry of Environment in Benin, Owerri, Ilorin and Yola, from March to May 2004. The zonal workshops discussed the draft copy of the NBSAP through a participatory approach and validated the information derived at state levels. The inputs from the states which were coordinated at the zonal levels, and reviewed and harmonized at a national workshop held in Lokoja in November 2005. Figure 1 illustrates the main biodiversity zones in Nigeria, and the locations where NBSAP workshops were held.

The survey on which this paper is based was conducted during the NBSAP national workshop held in Lokoja. The delegates to the national workshop formed the respondents to the survey. In the workshop, the attendance list of invited participants was compiled in alphabetical order. From the attendance list, 20% of the invited participants were selected using stratified random sampling. The selected

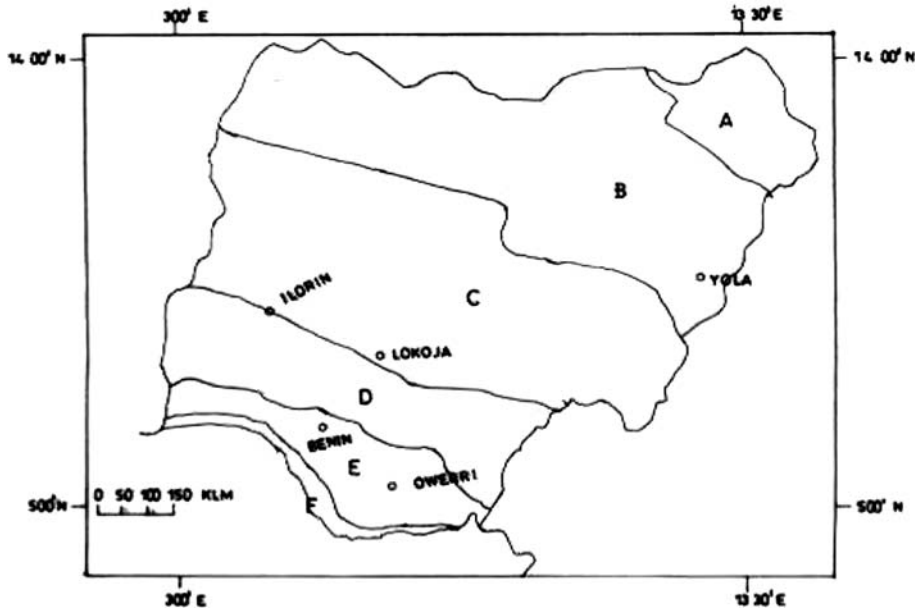

Fig. 1 Map of Nigeria showing major ecological zones and locations of biodiversity workshops. A = Sahel savannah; B = Sudan savannah; C = Guinea savannah; D = Forest-savannah mosaic: E = Moist lowland forest; F = Coastal-freshwater swamp

Table 1 Reference population for the survey

Stakeholders represented at the Lokoja NBSAP workshop	Population of stakeholders at the Lokoja NBSAP workshop			Selected respondents[b]	
	State representatives	Federal representatives	Total	Total	Sampling fraction (%)
Directors of forestry[a]	37	8	45	8	20
Directors of agriculture	37	6	43	8	20
Directors of health services	37	4	41	8	20
Directors of environment	28	6	34	6	15
Non-governmental organizations	25	–	25	5	13
Community based organizations	12	–	12	3	7
Associations of biodiversity users[c]	6	–	6	2	5
Total	172	24	196	40	100

[a] Directors include assistant directors, deputy directors and directors responsible for the offices in government establishments

[b] These are the sample of those that attended the Lokoja workshop selected for interview

[c] These represent sawmillers, gatherers, hunters, loggers and traditional medical practitioners

participants were identified, and briefed about their selection for interview and a copy of the questionnaire was given to each of them to study before personal interviews were fixed and conducted. Some of the questions raised in the questionnaire were open-ended. The sampling frame is presented in Table 1 while the questionnaire is provided in Appendix A. Group discussions on issues not covered in the questionnaire were held with respondents from the various ecological zones. A list of issues discussed is included in the questionnaire. The qualitative responses were recorded and the representative opinions of groups were sorted out for analyses.

Survey Findings and Discussion

Traditional Conservation of Biodiversity

Conservation of biodiversity at the local level is through traditional practices. These include taboos restricting the killing and capture of some wild animals *of cultural value* (manatee, elephant and lion), prohibition in felling and usage of *sacred* woody species (*Parkia biglobosa*, *Christophyllum albidum* and *Xylopia aetheopica*), protection of pregnant animals and eggs of wild animals, and prohibition of poison for fishing in inland waters. Other measures of protection include restricted access to ecosystems, closed season and closed access. Within these conservation measures are traditional practices of land use, harvesting and utilization methods of biodiversity discussed with respondents in Table 2. These traditional practices have not been effective in protecting wild biodiversity. Rather, some traditional practices are known to affect negatively the conservation of biodiversity at the local level, when for example the harvest of plants for cultural festivals and ceremonies involving large numbers of people is based on cutting of fronds of *Elaeis guineensis* for masquerade making annually (as in Otuo-Edo state) and immature wild animals are

Table 2 Respondents' view of traditional practices impacting on biodiversity management

Traditional practice	Main activities	Major impacts
Land use	Land fragmentation Shifting cultivation Annual bush burning Hunting of wild animals	Loss of species and loss of vegetation
Harvesting of biodiversity	Felling of trees Whole plant utilization Pollarding of trees Pruning of trees De-barking of trees Use of immature flowers/fruits	Loss of species of intensive use
Biodiversity utilization	Processing of biomaterial Storage difficulties Inadequate packaging of perishables Transportation difficulties	Reduced benefits from species exploited

used for rituals (*Tragelaphus spekei* and *Cephalophus rufilantus*). Respondents' views of some of the practices that negatively affect biodiversity conservation are listed in Table 2.

The negative effects of traditional practices presented in Table 2 have been claimed, by respondents in this study, to be responsible for species degradation in rural areas. This situation is not encouraging in locations where traditional methods of resource use are breaking down due to transition from communal to individual land tenure. This was blamed by 76% of respondents on the absence of extension workers, and of conservation education and training on best practices for the various land-use options in rural areas. Extension workers from government institutions are required to help smallholders make changes in traditional land-use practices that conflict with biodiversity conservation in farming as well as harvesting of wild bioresources.

Development of Traditional Knowledge on Biodiversity

Traditional knowledge developed on wild species varies among ecological zones, communities, families and individuals (using human groupings) and between and within species. At each level of development, the discoveries are held in secret and transferred through family lines from one person to another, which has made the transfer of traditional knowledge complicated. Because virtually all wild species of flora are used for traditional medicine, the traditional knowledge on them varies in accordance with the uses to which the individual species are put in various settlements. Two key examples were given by respondents on developed traditional knowledge on species, namely, the oil palm and the tortoise. First, the oil palm has been developed for producing edible oil, industrial oil, wine, mats, baskets, brooms, weaving ropes, rafters for roofing, fuel for domestic uses and traditional medicines. Second, the tortoise *is* used for divination, traditional medicine, cultural festivals and food. Each of the users on the oil palm (*Elaeis guineensis*), the tortoise and other species as listed in Table 3 are held either separately or collectively by individuals and families.

Table 3 Traditional knowledge developed on some species

Species	Respondents opinion on developed traditional medicinal knowledge on some indigenous species
Okoubaka aubrevillei	Incantations for harvest for preparation of traditional medicines, treatment of insanity, prevention of rainfall or forcing rain to fall for cultural ceremonies and festivals
Afromomun melagueta	Used to invoke spirits
Rafia hookeri	Tapping of wine
Archachatina marginata	Prevention and cure of high blood pressure (the fluid from the snail commonly used)
Trema guineensis	To cure broken bones in human and domestic animals
Parkinsinia aculeate	Used for household furniture and utensils

Table 4 presents respondents' views on how traditional knowledge on genetic resources at the local level was developed. The data in Table 4 indicate that traditional knowledge is developed along lines of occupations (farming, hunting and traditional medical practitioners). For example, different forms of traditional knowledge may be developed on the same species of plant among different branches of traditional medicine (trado-medicine, gynaecology, paediatricians, physiotherapy and psychiatry).

Infrastructure for Implementation of the CBD

Discussions on which the field survey was based revealed that the majority of the government staff that are directly responsible for forestry matters were not aware that Nigeria is a signatory to the CBD before the NBSAP workshops were held. The representatives of the Federal Ministry of Environment have been attending the meetings of Conference of Parties since 1994, but their activities have been limited to policy issues in terms of fostering forestry and environmental development, institutional development, and co-ordination and monitoring forestry projects supported by funds from federal and foreign sources.

As indicated in Table 5, the CBD has no threshold for its implementation in Nigeria because none of the basic infrastructure required for day-to-day

Table 4 Methods of developing traditional knowledge

Users of biomaterials	Respondents views on methods used to develop traditional knowledge on wild species
Medicinal practitioners	Folklore, family records, dreams and visions on plant preparations
Hunters	Long stay in the forests, family records and observations on wild species of flora and fauna
Wood carvers	Characteristics of wood to manipulations in carving
Food vendors	Social acceptance of species, natural aroma of plant species, nutritional value of species
Masquerade designers	Ability to produce and retain colour, ease of plant processing, weaving ability in species
Priests of idols	Folklore, observation of plant phenology and wild animal behaviours

Table 5 Infrastructure for implementing the CBD in Nigeria

Infrastructure required for implementing the CBD	Infrastructure available in Nigeria, 1992–2006	Reasons or explanation
Enactment of enabling CBD local laws at federal and state levels	None	Lack of political will to enact the law at the federal level and the 36 states of the Federation
Establishment of CBD Secretariat at Federal and state levels	None	Activities related to policies are carried out partially by the Federal Department of Forestry
Employment of enforcement officers	None	Lack of funds. No budgetary allocation for CBD implementation
Provision of uniforms and camping equipment	None	Lack of funds
Provision of vehicles for campaigns and enforcement	None	Lack of funds

implementation of the provisions of the CBD, as prescribed in ISD (2000), is in place at either the federal or state level (including the Local Government Councils). The implementing agencies for the CBD have failed to carry out activities that would help to cushion negative effects on access to genetic resources and biodiversity conservation. These activities which need to be carried out are to:

(i) Rehabilitate and restore degraded ecosystems and promote the recovery of threatened species (Article 8(f)).
(ii) Integrate conservation of biodiversity and sustainable use of biodiversity resources into the relevant cross-sector plans, programs and policies (Article 6(b)).
(iii) Support local populations to develop and implement remedial action in degraded areas where biological diversity has been reduced (Article 10(d)).
(iv) Respect, preserve and maintain traditional knowledge and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity, and encourage equitable sharing of benefits arising from the utilization of such knowledge, innovation and practices (Article 8(j)).
(v) Protect and encourage customary use of biological resources in accordance with traditional cultural practices that are compatible with conservation or sustainable use requirements (Article 10(c)).
(vi) Put in place national and state legislation to determine access to biodiversity and equitable sharing of benefits arising from the utilization of biodiversity (Article 15(1)).

At the federal level, the government has not been able to produce a comprehensive national biodiversity and strategic action plan since 1992. The drawback caused by this delay is that the state forestry services which are directly responsible for forestry matters cannot produce their own strategic plans in the absence of the national action plan. The lack of action plans for biodiversity management at the state level has: (i) made funds from international institutions and budgetary allocations for the

management of forests difficult to access; (ii) prevented the issue of access to genetic resources from receiving adequate attention from government and the public; (iii) made the national forest inventory impossible in respect of timber and non-timber resources necessary for the take-off of CBD implementation, thereby delaying large-scale regeneration of biodiversity in the various ecological zones of the country; and (iv) made it difficult for governments at the state level to establish the required infrastructure (including laws) for the management of the CBD.

Nigeria is a signatory to other international conventions on environment (including the convention on international trade in endangered species of wild fauna and flora, convention on the conservation of migratory species of wild animals, convention on climate change, and convention to combat desertification), apart from the CBD. These conventions are not implemented effectively to stabilize the natural environment and allow biodiversity to thrive. The main reasons for these shortcomings according to respondents in this study include:

(i) Lack of coordination among the environmental conventions signed in Nigeria. Most of the international laws are partially implemented only at the sector level, without a cross-sector approach at state and federal levels.
(ii) Lack of basic infrastructure to implement conventions ratified by the federal government. The conventions are viewed as sector matters without any available fora to receive inputs from other sectors.
(iii) Implementation of laws and conventions are not supported by budgetary allocations at federal, state and local government levels.
(iv) Stakeholders are not fully informed and aware of the conventions and laws that relate to the environment. There are no dialogues, campaigns and conservation education activities among users of biodiversity, and best practices on biodiversity utilization are largely unknown to stakeholders.

Policies on the Management of Biodiversity

The forms of access to biodiversity in terms of collection of species harvest, farming, recreation and spiritual practices reported by survey respondents are listed in Table 6.

The data in Table 6 reveal that only the rights of the community (group) and families are absolute. The individual rights are inferior and can be withdrawn while the absolute rights are relatively permanent but subject to group reviews. Nevertheless, under the *Land Use Act 1978* (FGN 1978), the Administrator of Land at the local government level and the Governor of the state can over-ride community rights to land, provided there is consent from the members of the community. The communities under land tenure regimes assign access rights for the harvest of biodiversity resources as in the case of wild forest foods and aquatic resources. The communal interest to sustain the traditional culture is supreme. This is important because under the tenure system of restricted access to a resource, the loss of a species is regarded as a cultural loss, which deprives future generations of the use of those particular resources. The case of *Okoubaka aubrevilleii* which was once abundant but for which there are currently less than 20 stands in the country has posed a challenge to stakeholders in terms of conserving the species.

Table 6 Forms of access to exploit biodiversity in rural areas

Form of access to biodiversity	Respondent views on access regimes on biodiversity		Examples of biodiversity under control through access regimes
	Limited to particular forests	Practiced in all forests	
Community access (group access or rights)		√	Habitats including bad bush, stool forest, shrine forest and hunting grounds[a]
Family access (group access or right, including ancestral rights of the family)		√	Habitats including masquerade forests, shrine forests and burial grounds
Individual access	√		Plants and animal species under control by the community
Free or open access	√		Biodiversity not under control, including plants, animals, water resources and minerals
Restricted access		√	Habitats and species (on seasonal basis or placed under taboos)

[a] *Bad bush* is a term used to describe areas where witches that confessed are buried when they die; *stool forest* is forest under the strict control of traditional rulers; *shrine forest* is a forest hosting idols that are worshipped by the people; and *masquerade forest* is forest where masks and masquerades are designed and kept after festivals

Some of the provisions of the CBD are difficult to enforce, either because of the absence of local laws enacted to support the CBD or because the provisions are contradictory with national laws. For example, Article 10(c) that encourages parties at national level 'to protect and encourage customary use of biological resources in accordance with traditional cultural practices that are compatible with conservation or sustainable use of biological diversity' cannot be implemented directly by the federal government. Moreover, Article 15(1), which also states that 'the authority to determine access to genetic resource should rest with the national government subject to the national legislation', is clearly at variance with the situation in Nigeria. These provisions of the CBD do not conform to the *Land Use Act 1978* and the land tenure regimes in the country because the federal government has no overriding control on land and biodiversity matters. The laws and regulations showed that:

(i) all land under the jurisdiction of a state is vested in the Governor of the state who holds it in trust for the people;
(ii) state legislatures make laws on land use practices including access to biodiversity only within the state of their jurisdiction;
(iii) access to biodiversity is determined at the community level within the state where the custodians of the land hold all the resources occurring in the community land in trust for the people;
(iv) sustainable management of the forests outside constituted forest reserves is an issue for the local communities responsible for land and biodiversity, and the state and local governments are responsible for the management of forest

reserves including the control of specific economic trees on community lands outside the government reserves; and

(v) the national legislation covers only export control of biodiversity and not access to biodiversity in State-owned lands.

Access to Genetic Resources in Nigeria: Who Decides?

Access to biodiversity within the auspices of the CBD is meant to be based on prior informed consent granted for clearly stipulated uses with basic information on types and quantity of genetic resources to which access is sought, duration of exploitation, mutually agreed benefit-sharing arrangements and sovereign rights of country of origin (CBD 2002). In Nigeria, access to biodiversity hardly meets these guidelines because they have not been adequately based on the enabling law. It was claimed by respondents (but not verified) that some major genetic resources plus traditional knowledge based on them have been illegally taken from the country and the patent rights on the use of the genetic resources are placed on those that fail to observe the due process in granting access to genetic resources. These have generated fears on granting access to biodiversity at various levels as indicated in Table 7.

The fears of stakeholders reported in Table 7 arise because of lack of interactions between stakeholders and implementing agencies of the CBD. These fears may be ephemeral and they can be overcome as situations become clearer to communities responsible for holding biodiversity in trust for the people.

The weakness in the implementation of the CBD in Nigeria lies on the ownership question and the source of funding. The issue of protection of biodiversity is the responsibility of the state governments. The federal government cannot dictate to the states how to manage their forests and the biodiversity occurring in them. Even when the federal government provides funds for biodiversity conservation, the responsibility of executing the programs rests on the states. The main roles of the Federal Government in the management of biodiversity are to: (i) formulate national forest policy and land-use planning, (ii) foster forestry and environmental

Table 7 Fears of local people on access to biodiversity under the CBD

Implication	Respondents views on granting access to biodiversity
Political	There is a lack of political will to support and direct the people on the best practices for access to biodiversity by non-natives of the community
Social	The uniqueness of social affiliations on traditional ecological knowledge in villages and towns may be eroded
Economic	Fears of losing untapped wealth to aliens (strangers within and outside the country) are strong among the people
Cultural	The belief of guiding spirits of biodiversity is being put to question. The rules and regulations for the management of biodiversity are often based on indigenous beliefs, social rules and traditional ecological knowledge of landowners.
Ethical	There are fears on erosion of ancestral heritage to alien towns
Biological	Uncontrolled access and poor conservation efforts may lead to loss of species and habitats
Ecological	Intensive harvest of biomaterials may affect long-term distribution of species as a result of changes in soil temperature due to direct sunlight. This has been noticed in *Afromomum melagueta* and *Genetun africana* that thrive under the forest floor.

development, (iii) promote and assist states in funding projects of national interests, (iv) co-ordinate and monitor federal-funded projects, and (v) facilitate foreign interests and technical assistance for forestry and environmental projects. Thus because the federal government has no forest estate of its own (except the national parks they hold in trust for the states), it is only responsible for advocating national objectives and streamlining ways and means towards attainable goals.

It is not possible or feasible to implement the CBD without involving the local communities that live on biodiversity for sustenance. The reasons for these are that the CBD provides that the local communities must be: (i) fully involved in the management and protection of biodiversity; (ii) fully considered in the sharing of benefits arising from the use of biodiversity; (iii) involved in the application of traditional knowledge and practices in the conservation of biodiversity; (iv) participatory in the implementation of activities in biodiversity conservation; and (v) motivated to co-operate in all aspects to the conservation of biodiversity in terms of in situ and ex situ measures. Since these activities are not in place and operational, it means the CBD is not being fully implemented in Nigeria at moment.

Table 8 presents the views of respondents on the six levels to which issues of access to biodiversity relate, and these represent the reality on the ground. These include the individual, the family, the community, local government, and state and federal government. The state forestry laws have direct links among regimes on common property resource utilization, land tenure and access to and utilization of genetic resources. The state forestry laws prohibit unauthorised access to and exploitation of bioresources including the native vegetation from legally constituted protected forests. Access to biodiversity in designated forests is only open to licence or permit holders and individuals or families granted access by law during the establishment of the protected forest. The state forestry laws and the *Land Use Act 1978* are the primary laws that address issues relating to access to genetic resources. Thus the implementation of international law on biodiversity (as prescribed in the CBD) cannot be carried out without the consent of state governments in whose territories the biodiversity is located. This same rule also applies to state versus local governments and between the local governments and landholding communities.

Table 8 Levels of access to biodiversity in Nigeria

Stakeholders in access to biodiversity	Functions of stakeholders on levels of access to biodiversity
Federal government	Ratification of conventions and enforcement of international and federal laws
State government	Enacting laws on land and forestry matters including access to and utilization of biodiversity. Collect revenue on biodiversity exploitations
Local government	Enacting byelaws on land use and access to and utilization of biodiversity. Collect revenue on biodiversity exploitations
Landholding communities	Giving rights of consent on access to and utilization of biodiversity
Ancestral families of communities	Making decisions on granting consent on access and use of biodiversity
Individuals in the communities	Execute decisions of families and the community on access to biodiversity

At present there is no legislation vesting interests in biodiversity to the federal government. Therefore on the basis of the law, the federal government cannot decide on access to biodiversity on state-owned lands. It should be acknowledged that the federal government, being a signatory to the Convention on International Trade on Endangered Species of Flora and Fauna (CITES), regulates the international trade on endangered species (Osemeobo 1999), although this in no way can be construed to be access to biodiversity. The opinions of respondents on various issues of access to biodiversity are reported in Table 9.

As indicated in Table 9, stakeholders of biodiversity management (i) support the CBD in terms of access to biodiversity and equitable sharing of benefits derived from using biomaterials, (ii) hold the view that users of biological resources should fund and participate in the management of forests (through in situ conservation), and (iii) support transparency in all aspects of biodiversity conservation including access to biodiversity. At the local level, access to biodiversity is within the framework of the tenure systems. For the individual to gain access to genetic resources, these resources must be acquired from the community. Once access rights to the land and genetic resources have been granted, the holder of the rights is allowed to exploit the biodiversity subject to the overall rules and regulations of the community.

Data analysis in this study reveal that the council of elders at community level decides on access to resources including biodiversity and, depending on the circumstances, may impose open access, restricted access (with selective access) or closed season for harvesting or exploitation of resources. To obtain access rights, non-members of the community are made to pay prescribed fees once or as instalments before they harvest bio-resources. These include: (i) a *familiarisation fee* paid to informants that would introduce the resource user to the members of the council

Table 9 Opinions of stakeholders on access to biodiversity

Statements	Number of respondents (n = 40)		
	Agree	Disagree	Undecided
1. Communities should support access to biodiversity	40	0	0
2. Communities should support access to traditional knowledge	20	15	5
3. Communities should support equitable sharing of benefits from the use of biodiversity	35	5	0
4. Those seeking access to biodiversity should participate in protecting the forests	40	0	0
5. Those seeking access to biodiversity should finance in situ conservation of species	40	0	0
6. More research should be conducted for ex situ conservation of endangered species	40	0	0
7. Rural landowners should be empowered to apply traditional methods of plant conservation in various land use practices	35	0	5
8. Users of biodiversity should be empowered to acquire modern methods of harvesting, storing and processing of biodiversity products	40	0	0
9. Access based on prior informed consent must be transparent	40	0	0
10. Management of forests should be based on mutually agreed roles (and shared responsibilities) of stakeholders and not left for government alone	26	12	2

of elders; (ii) an *introduction fee* paid to the members of the council of elders as a token for buying cola before the issue of bio-resource harvest is introduced to them; (iii) an *entertainment fee* paid to the council of elders in session and used for their transportation after the entertainment; (iv) an *exploitation fee* paid for a specified quantity of biodiversity products over a specified timeframe; and (v) a *disturbance fee* paid to restore the habitat. If the resource is located in a cultivated area, then the fees are paid to the occupier of the land; otherwise, they are paid to the council of elders. This reveals a high overhead costs in access to biodiversity resources.

It is impossible to use biodiversity without the knowledge of the communities and without payment of fees to the land-owning communities. This is so because the local people believe that the biodiversity belongs to them, including the past, present and future generations. The state governments recognise that communities should be paid a *consent fee* as a token for the custodians of biodiversity, that is, those that have protected the resource until the time of harvest. Even if the state government has issued a license for a resource to be exploited in the community forests, the *consent* of the communities to approve such harvest is paramount. The activities of the landowners seem counter to sustained conservation practices because the local people that grant the final access to biodiversity exploitation do not document such information to know how much exploitation of biological resources is occurring in the different locations through internal and external agencies. This is not good for planning for the sustainable conservation of species. Inventory of biological resources is required in all forest location for proper data collection on the status of biodiversity.

Policy implications for implementing the CBD

A review of documents and this survey findings have revealed that decision-makers support access to genetic resources as provided for under the CBD. However, the main issue of concern is that all activities relating to access to biodiversity and, in particular, genetic resources must follow the due process and be seen to be transparent. Because the due process functions best under the rule of law, dialogue, a participatory approach and transparency, there is no room for discrimination among Nigerian users of genetic resources. The difficult questions are: 'How can access to genetic resources be guaranteed?' And 'how can genetic resources be conserved and sustained to meet increasing demands in terms of sustainable harvest?'

Some ways of moving forward are suggested based on the results obtained in this study. To achieve compliance with the provisions and spirit of the CBD in Nigeria, it is advocated that:

(i) a federal government law is urgently required to provide a catalyst approach for states to support all the environmental laws ratified by the national government including the laws relating to the CBD. It is believed that a holistic approach to the implementation of all ratified conventions will promote cross-sector approaches, and attract funding for environmental concerns;
(ii) national inventories and other studies need to be conducted for biodiversity in terms of bio-species in natural and agro-ecosystems. Data are also required in areas of species occurrence, distribution, stability of habitats, enthnobotany, traditional knowledge developed on the variety of genetic resources, requirements for access to genetic resources among major communities. Current

information on the biodiversity is scarce in Nigeria and cannot be relied upon for planning for the management of the environment;

(iii) access to genetic resources needs to be incorporated into regional land-use planning at cross-sector levels using a participatory approach with all stakeholders;

(iv) stakeholders of biodiversity and the natural environment (policy and decision makers, users of biomaterials, local people living on biodiversity and international organizations) be made partners in the implementation of environmental conventions including the CBD and generate a free flow of information among stakeholders through environmental and conservation education. The poor and the rich that depend on biodiversity should be empowered and trained on skills acquisition on best practices for conserving species, harvesting practices, processing, and storage and packaging of biomaterials for household needs and the market; and

(v) at local government level, a bye-law needs to be put in place to ensure that granting access to genetic resources does not lead to the degradation of these resources and the environment.

(vi) the need to harmonize these fees by the council of elders in each community is urgent and may be the community ought to look at issues of overexploitation of biodiversity through effective monitoring, record keeping and inventory of the forests.

Conclusion

The information collected from this survey attempts to shed light on the question of who decides access to biodiversity resources in Nigeria. The implementation of the CBD has not been effective in Nigeria, and the convention faces stiff challenges arising from lack of political will of government including officials responsible for its implementation. Access to biodiversity at the local level is primarily determined by the land tenure system in vogue in an area. It is concluded that rural landowners are responsible for the final decision on issues of access to biodiversity including genetic resources.

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Appendix A: Questionnaire on Access to Genetic Resources in Nigeria

I. Public Awareness

1. Were you aware before this workshop was held that government ratified the CBD in 1992? Yes —— No ——
2. If you were aware of the CBD what are the major issues addressed by the document?

II. Access to Biodiversity

3. From the information disseminated from this workshop do you support the implementation of the CBD in your locality? Yes —— No ——

4. Express any doubt you have about sustainable implementation of the CBD: a) political —— b) Social —— c) Economic —— d) Cultural —— e) Ethical —— f) Biological —— g) Ecological ——
5. Express your views on your support for the implementation of the CBD as indicated in the table below:

Statements in the implementation of the CBD	Agree	Disagree	Undecided
1. Communities should support for access to biodiversity			
2. Communities should support access to traditional knowledge			
3. Communities should support equitable sharing of benefits from the use of biodiversity			
4. Those seeking access to biodiversity should participate in protecting the forests			
5. Those seeking access to biodiversity should help to finance in situ conservation of species			
6. More research should research conducted for ex situ conservation of endangered species			
7. Rural landowners should be empowered to apply traditional methods of plant conservation in various land use practices			
8. Users of biodiversity should be empowered to acquire modern methods of harvesting, storing and processing of biodiversity products			

6. Discuss the legal lines of access to biodiversity in your locality and up to the time a biomaterial is exported from the country: a) identification of a resource —— b) consultation for resource exploitation —— c) resource exploitation —— d) permits for exportation ——
7. Discuss the traditional forms of access to biodiversity from your locality ——

III. Infrastructure for implementing the CBD

8. Is there any infrastructure for implementing the CBD in your locality? —— or sate as a whole? ——

IV. Traditional practices on biodiversity

9. a) Which are the main traditional practices that affect management of biodiversity in your locality? ———— b) Discuss each of these traditional practices ————

V. Traditional knowledge on biodiversity

10. How is traditional knowledge developed on genetic resources in your locality? ————

11. a) Give examples of species which traditional knowledge has been fully developed in your locality ————— b) Discuss each of these examples ————

VI. Recommendations

12. Explain how you feel the CBD should sustainably be implemented in the country —————

VII. Discussion Group

The list of issues discussed includes: culture and access to biodiversity, effectiveness of traditional controls imposed on biodiversity management, roles of men, women, and men in biodiversity conservation, level of a awareness about the CBD, intensity of harvest imposed on biodiversity, traditional methods of forest inventory and harvest rate of desired species Thank You.

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